Congressional Budget Office
Washington, D.C.

**Methods for Analysis of the Financing and Use of
Long-Term Services and Supports**

**Supplemental Material for**
*Rising Demand for Long-Term Services and Supports for Elderly People*

June 2013

This document describes the data and methods underlying the 23 exhibits presented in
Congressional Budget Office, *Rising Demand for Long-Term Services and Supports for
Elderly People* (June 2013), www.cbo.gov/publication/44363.

Most of the statistics presented in *Rising Demand for Long-Term Services and Supports for Elderly People* are based on tabulations of data from the Health and Retirement Study (HRS, http://hrsonline.isr.umich.edu/) and the Access to Care files of the Medicare Current Beneficiary Survey (MCBS, http://go.usa.gov/b7TP). The statistics are population-weighted averages of measurements taken from the data available in those surveys from 2000 to 2010.

Before 2000, the HRS and MCBS, like other surveys measuring elderly people's functional limitations, showed a relatively consistent decline in the prevalence of functional impairment over time. However, over the period from 2000 to 2010, the data do not show a consistent trend for elderly people living in the community. The prevalence of functional limitations among such people appears to have risen somewhat in the first half of the decade but then to have fallen during the second half. Because of the lack of a clear trend, in most of the exhibits in this report, the Congressional Budget Office (CBO) reports population-weighted averages from the entire 2000–2010 period. The exceptions are some statistics concerning the number of elderly people residing in institutions, which generally declined from 2000 to 2010, according to MCBS data. In those cases, the reported statistics are based on data from the 2010 MCBS (except for Exhibit 14, which uses the 10-year average because of small sample sizes in population subgroups).

## Data From the Health and Retirement Study

The Health and Retirement Study, established in 1992, surveys people in the U.S. population who are age 50 or older to collect a variety of information, including income and demographic data and data on health and functioning. The HRS is primarily a community-based survey of the noninstitutionalized older population. Because it is a longitudinal survey, it follows participants as they move (including into nursing homes). The HRS is particularly valuable to researchers because it provides information on older adults who are not yet elderly, in addition to elderly adults (those 65 or older). The survey is conducted every two years. CBO's analysis uses data from the surveys for 2000, 2002, 2004, 2006, 2008, and 2010.

For each year, respondents were included in CBO's tabulations if, at the time of the interview, they were at least 65 years old, were interviewed in the year in which the survey took place, and were not institutionalized. That information is available in the 2010 HRS Tracker File, which tracks every person who has ever been part of the survey population. Population weights, used to scale the survey results to produce national-level statistics, were also taken from the Tracker File. The RAND Data File, created by the RAND Corporation from HRS data, contains longitudinal and some demographic variables created from the original HRS variables. The RAND Data File is the source for statistics on income (measured as a percentage of the federal poverty thresholds), body mass index (BMI), race, and ethnicity. All other data come from the files for each of the survey years included in the statistics.

## Data From the Medicare Current Beneficiary Survey

The Medicare Current Beneficiary Survey, also a longitudinal survey, was established in 1991 as an annual survey of Medicare beneficiaries in the community and in institutional settings. The survey includes two modules: Access to Care, and Cost and Use. The Access to Care files provide data on beneficiaries' access to medical care, their satisfaction with that care, and the usual sources of care. The files are based on a sample of Medicare beneficiaries enrolled for the entire calendar year, and thus they exclude beneficiaries who newly enroll or die during the year. (In contrast, the Cost and Use files include all beneficiaries enrolled for any part of the year.)

The MCBS data for this analysis, taken from the annual Access to Care surveys from 2001 through 2010, form the basis of the statistics reported for institutionalized elderly people and provide limited data on community-based Medicare beneficiaries. (Data from the Cost and Use files were not used in this report.) Although the Access to Care files do not include beneficiaries who newly enroll or die during the year, statistics using either module are similar. Like the HRS, the MCBS gathers information from some individuals under age 65, but because they must be Medicare beneficiaries to be included in the survey and because they can qualify for Medicare at earlier ages only if they are disabled, MCBS tabulations of people younger than 65 are not representative of the under-65 population as a whole.

For each year of the MCBS, respondents were included in CBO's analysis if their housing data were collected using the facility questionnaire rather than the community questionnaire and if they were at least 65 years of age at the time of the interview. The MCBS asks a series of questions on physical and cognitive abilities that CBO used to calculate statistics on institutionalized seniors.

## Notes on Exhibits

This section provides background information on the data and methods CBO used for the exhibits in this report.

### Exhibits 1 and 2

The data come from CBO's projections of the U.S. population, which are based on the intermediate (midrange) values for fertility and mortality rates in the 2011 report of the Social Security trustees, but with CBO's estimates of immigration; see Congressional Budget Office, *The 2012 Long-Term Budget Outlook* (June 2012), p. 31, www.cbo.gov/publication/43288.

### Exhibits 3 and 4

The estimates of expenditures are based on published and unpublished data in the national health expenditure accounts provided by the Office of the Actuary at the Centers for Medicare & Medicaid Services (CMS). See Micah Hartman and others, "National Health Spending in 2011: Overall Growth Remains Low, But Some Payers and Services Show Signs of Acceleration," *Health Affairs*, vol. 32, no. 1 (2013), pp. 87–99, http://tinyurl.com/maapou7. CBO adjusted those data to represent expenditures exclusively for elderly people. Adjustments for Medicaid spending were based on age-related spending data for 2009 that were available from the Medicaid Statistical Information System. Adjustments for Medicare spending were based on age-related spending data for 2010 available from the Beneficiary Annual Summary File. Adjustments for all other sources of spending were based on CMS's data; see Centers for Medicare & Medicaid Services, *Health Expenditures by Gender and Age, Details for Year: 2004*, http://go.usa.gov/bGhw.

Data on the economic value of informal care come from the Health and Retirement Survey. Estimates of the number of hours of donated care (see the note for Exhibit 10, below) were multiplied by the average hourly wage of a typical long-term care worker in 2011.

The definition of institutional care used in Exhibits 3 and 4 differs somewhat from the definition used in Exhibits 11 through 14. Exhibits 3 and 4 use data from CMS, which defines institutional care as care provided in skilled nursing facilities, nursing homes, and nursing facilities housed inside continuing care retirement communities. The definition used in Exhibits 11 through 14 is broader and is based on the

criteria used by the Medicare Current Beneficiary Survey to determine whether to use a facility questionnaire or a community questionnaire in collecting data on housing. In that survey, the facility questionnaire is used if the respondent lives in a facility that has three or more beds and is either a nursing home—a facility licensed by the state to provide skilled nursing care as well as personal care—or some other type of long-term care facility or a facility (licensed or unlicensed) that provides around-the-clock caregiver supervision, supervision of medications, or assistance with activities of daily living (ADLs) or instrumental activities of daily living (IADLs) for its residents. The definition used in the national health expenditure accounts is similar to that used by the American Community Survey, and its estimates of the rate of institutionalization among the elderly (3.9 percent) are consistent with those of the MCBS (4.2 percent).

## Exhibits 5, 6, and 7

The data source for these exhibits is the Health and Retirement Study. In that survey, respondents are asked if they have any difficulty performing each of these activities of daily living: bathing, dressing, walking, transferring (out of a bed or chair), eating, and using the toilet. If respondents report "yes," "can't do" the activity, or "don't do" the activity, they are counted as having a functional limitation in that ADL.

To measure respondents' ability to perform the instrumental activities of daily living, respondents are asked if they have any difficulty preparing meals, shopping, using the telephone, taking medications, and managing money. If respondents report "yes," or if they report that they "can't do" or "don't do" the activity *and* give as the reason for that response that they have a "health or memory problem," then they are counted as having a functional limitation in that IADL. (Some respondents may not perform a particular IADL, such as shopping for meals, for reasons unrelated to health; that is not the case with ADLs.)

Respondents are then grouped into four mutually exclusive categories, in order of increasing functional loss: no impairments (no difficulty with any ADL or IADL); IADLs only (a respondent reports difficulty with one or more IADLs but no difficulty with any ADL); difficulty with one or two ADLs; and difficulty with three or more ADLs. People reporting ADL losses may also have impairments in one or more IADLs.

For Exhibit 6, data on educational attainment were taken from the 2010 HRS Tracker File. The specific question on educational attainment asks the respondent to report the number of years of formal education he or she received. Respondents are then classified as having less than a high school diploma (11 or fewer years of education), a high school diploma (12 years), some college (13 to 15 years), a college degree (16 years), or postcollege education (17 or more years).

For Exhibit 7, data on race and ethnicity come from the RAND Data File. CBO used two variables to create a single composite variable addressing both race and ethnicity. First, respondents were classified as Hispanic if they reported that ethnicity. Using a variable for reporting race, CBO then separated respondents who reported being non-Hispanic into white and nonwhite (all races other than white). Thus, people classified as Hispanic in the exhibit may be white or nonwhite.

**Exhibit 8**

The data for this exhibit come from the Health and Retirement Study, in which respondents are asked a series of questions aimed at assessing their cognitive abilities. Points are awarded for correct answers to the questions; the highest possible score is 35 points. The questions' subjects and points for correct answers follow:

- The interviewer states 10 words and asks the respondent to repeat them (1 point each, 10 points possible);

- Later in the interview, the interviewer asks the respondent to again repeat the words (1 point each, 10 points possible);

- The respondent is asked to give the day of the week and the day, month, and year of the calendar date (1 point each, 4 points possible);

- The respondent is asked to state the names of the current president and vice president of the United States (1 point each, 2 points possible);

- The respondent is asked to name the tool used to cut paper (1 point) and a prickly plant found in the desert (1 point);

- The respondent is asked to count backward from 100 by 7, five times (that is, 93, 86, 79, 72, and 65; 1 point each, 5 points possible); and

- The respondent is asked to count backward from 20 to 10 (2 points).

Respondents who score 10 or fewer points are classified as cognitively impaired. In cases in which respondents are not asked all of the questions, the minimum number of points required to be considered *not* cognitively impaired is reduced to be consistent with the total number of points that could be awarded given that not all of the questions were asked. For example, if two questions were never asked and those questions were worth 1 point each, then the minimum number of points to be considered *not* impaired (10) is reduced by 2 points (to 8).

For details on the measurement of cognitive impairment, see Richard W. Johnson and Joshua M. Wiener, *A Profile of Frail Older Americans and Their Caregivers,* Retirement Project Occasional Paper 8 (Urban Institute, February 2006), www.urban.org/publications/311284.html; and A. Regula Herzog and Robert B. Wallace, "Measures of Cognitive Functioning in the AHEAD Survey," *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, vol. 52B, special issue (1997), pp. 37–48, http://tinyurl.com/k4uryyd. The statistics generated using the approach outlined above are consistent with Johnson and Wiener's findings using the 2002 HRS.

**Exhibit 9**

The data for this exhibit are from the Health and Retirement Study. In addition to asking respondents about their difficulty in performing ADLs and IADLs, surveyors ask respondents about receiving assistance. Fewer respondents receive help than report difficulty because many people who report difficulty are still able to perform ADLs and IADLs, albeit with difficulty.

Respondents are counted as receiving help if, for a particular ADL or IADL, they respond affirmatively that they have received assistance. In this exhibit, the percentage of people receiving assistance is broken out according to the level of functional loss for which they report difficulty, not the level of functional loss for which they receive assistance; a person reporting difficulty in performing three or more ADLs may receive assistance with only one or two of them.

## Exhibit 10

The data for this exhibit come from the Health and Retirement Study. Each respondent who receives help answers a series of questions about each person who provides help, including the number of hours of help provided in the prior month and whether that helper was paid or provided services for free. For each respondent who reports having received assistance, the total number of hours of assistance is divided into hours of assistance donated or paid for (either out of pocket or by a third party). In this exhibit, the hours consist of the average number of hours of care given for which the person received assistance. As such, the average does not include respondents who report receiving no assistance.

## Exhibit 11

The data for this exhibit come from the Medicare Current Beneficiary Survey. The definition of institutionalization for this exhibit encompasses those facilities for which the MCBS collected housing data from respondents using the facility questionnaire. That questionnaire is used if the respondent is a full-time resident of a facility that has three or more beds and is either a nursing home—a facility licensed by the state to provide skilled nursing care as well as personal care—or some other type of long-term care facility or a facility (licensed or unlicensed) that provides residents around-the-clock caregiver supervision, supervision of medications, or assistance with the activities of daily living or instrumental activities of daily living.

Respondents are identified as living in a nursing home if the facility identifies itself as a nursing home, reports that one or more of its beds is certified for Medicare or Medicaid beneficiaries, or has one or more beds licensed for skilled nursing care. All other respondents receiving the facility questionnaire are designated as living in a residential care facility or some other long-term care facility.

## Exhibit 12

The data for this exhibit come from the Medicare Current Beneficiary Survey, which reports on institutionalized beneficiaries and on beneficiaries living in the community. In this exhibit, the two categories of institutionalization are "nursing home" and "residential care facility or other type of facility," consistent with the criteria applied by the MCBS in determining which respondents live in a facility. For survey respondents classified as living in the community, those who report living in an assisted living facility or in some other type of housing that provides supportive services (including help in managing medications as well as providing meals, cleaning services, or laundry services) are considered to be living in "community-based residences with supportive services." All other respondents in the community are considered to be living in private homes.

This exhibit reports on housing only for people who receive some type of long-term service or support. People classified as institutionalized are assumed to be receiving assistance; housing characteristics for people living in the community are restricted to housing characteristics for people who report having received assistance in the previous month.

## Exhibits 13 and 14

The data source for these exhibits is the Medicare Current Beneficiary Survey. Respondents are considered institutionalized if their housing data were collected using that survey's facility questionnaire. The statistics on race and ethnicity were collected using the same methods as for Exhibit 7. Two variables were used to create a single composite variable that addresses both race and ethnicity. First, respondents were classified as Hispanic if they reported that ethnicity. Using a variable for reporting race, respondents who reported being non-Hispanic were then separated into white and nonwhite (all races other than white). Thus, people classified as Hispanic in the exhibits may be white or nonwhite.

Functional loss for each ADL is determined on the basis of whether the respondent reported having difficulty performing the ADL, having been supervised doing so, or having received assistance in performing the ADL. Data on difficulty performing IADLs were collected in a similar fashion.

Cognitive impairment is determined by a respondent's answers to questions about short- and long-term memory, understanding of his or her living situation, difficulty making daily decisions, and whether he or she has been diagnosed with Alzheimer's disease. Specifically, the respondent is considered to be cognitively impaired if he or she has Alzheimer's disease, is severely impaired in making decisions, or reports problems in at least three of the following areas: short-term memory, long-term memory, understanding that he or she is living in a nursing home, or knowing which room he or she lives in.

## Exhibit 15

The data on prices for services come from MetLife Mature Market Institute. For 2012, data are from "Market Survey of Long-Term Care Costs—The 2012 MetLife Market Survey of Nursing Home, Assisted Living, Adult Day Services, and Home Care Costs" (accessed June 21, 2013), http://tinyurl.com/bxg4exu. Data for previous years were obtained by CBO staff through personal communication. Except for the data concerning the cost of home health aides, the prices are a reported daily rate multiplied by 365 days to represent an annual rate. The price of services provided by a home health aide is the hourly wage multiplied by 4 hours per day, by 5 days per week, by 52 weeks per year. The data are intended to track historical patterns in the price of care, so changes in use were held constant. In reality, the average length of stay in a nursing home might be less than 365 days in a year, and the average use of a home health aide might change over time from 20 hours per week.

## Exhibit 16

The source for data on Medicaid is the Centers for Medicare & Medicaid Services, Form CMS-64 (administrative cost data on the use of different types of Medicaid-covered services). For Medicare, the data sources are the *Medicare and Medicaid Statistical Supplement* (for 2001 to 2010), http://go.usa.gov/b7ZG, and Congressional Budget Office, *Financing Long-Term Care for the Elderly* (April 2004), pp. 10–11, www.cbo.gov/publication/15584 (for 1995 through 2000). Data for the remaining years—2011 to 2023—come from CMS and from CBO's baseline projections (Congressional Budget Office, "Medicaid—May 2013 Baseline" (May 14, 2013), www.cbo.gov/publication/44204, and Congressional Budget Office, "Medicare—May 2013 Baseline" (May 14, 2013), www.cbo/gov/publication/44205 (adjusted to reflect expenditures for people age 65 or older). In addition, the Medicare projections hold constant Medicare Advantage enrollment as a share of total Medicare enrollment.

**Exhibit 17**

The data for this exhibit come from the Medicare Current Beneficiary Survey. The MCBS asks respondents if they have Medicaid coverage and also obtains administrative data on enrollment from the Centers for Medicare & Medicaid Services. In this exhibit, MCBS respondents are considered to be enrolled in Medicaid if they report that coverage in response to survey questions *or* if they are identified as being enrolled according to CMS's administrative data.

**Exhibit 18**

The data for this exhibit come from the Health and Retirement Study. Respondents are considered to have private long-term care insurance if they report having a policy that covers personal care in the home or residence in a nursing home for a year or more. Respondents are considered to be Medicaid beneficiaries if they respond "yes" to the question in the survey that asks whether they are enrolled in Medicaid. (The HRS does not use CMS's administrative data to identify Medicaid beneficiaries.)

**Exhibit 19**

For this exhibit, the data come from the following reports, all from the National Association of Insurance Commissioners: *Long-Term Care Insurance Experience Reports for 2008*, "Countrywide Experience, Form A, Ten-Year Summary" (for 1998 to 2007); *Long-Term Care Insurance Experience Reports for 2009*, "Countrywide Experience, Form A, Ten-Year Summary" (for 2008); *Long-Term Care Insurance Experience Reports for 2010*, "2010 Long-Term Care Insurance Experience Reporting–Form 1, Actual vs. Expected Claims and Persistency, Aggregated Totals" (for 2009); and *Long-Term Care Insurance Experience Reports for 2011*, "2011 Long-Term Care Insurance Experience Reporting–Form 1, Actual vs. Expected Claims and Persistency, Aggregated Totals" (for 2010 and 2011). For all years except 2010 and 2011, the data reported are the number of covered lives; for 2010 and 2011, the data reported are "Lives Inforce End of Year."

**Exhibit 20**

The enrollment data for California, Connecticut, Indiana, and New York are collected from the individual state programs. The source for the enrollment data for all other states for 2009 to 2012 is Truven Health Analytics, "DRA Partnership Reports" (accessed May 7, 2013), http://w2.dehpg.net/LTCPartnership/Reports.aspx.

**Exhibits 21, 22, and 23**

These exhibits present three hypothetical scenarios about future trends in the prevalence of impairment:

- Sex- and age-specific prevalence of functional limitations remain constant,

- The prevalence of functional limitations falls as obesity declines to levels observed in 1978, and

- The prevalence of functional limitations increases as obesity rises.

The first scenario holds constant the population-weighted average prevalence observed in the results from the Health and Retirement Study for 2000 to 2010 and the institutionalization rates observed in the MCBS, and it applies the shifts in the age and sex composition of the elderly population projected for 2020, 2030, 2040, and 2050. Because of the growth in the number of younger elderly people (ages 65 to 74) brought about by the aging of the baby boomers, this scenario results in a lower prevalence of

functional limitations among all elderly people (65 and older) in 2020 and 2030 than in 2010. Average prevalence rises in 2040 and 2050 as baby boomers move into older age brackets, in which they have a higher likelihood of experiencing a loss in physical or cognitive functioning. In 2010, 54 percent of elderly people were between the ages of 65 and 74. In 2020, CBO projects, 59 percent will be in that youngest category. The rate will fall back to 54 percent in 2030 and then to 46 percent in 2040 and 2050.

The second scenario is based on the work of Dana Goldman and others as presented in "The Fiscal Consequences of Trends in Population Health," *National Tax Journal*, vol. 63, no. 2 (June 2010), pp. 307–330, http://ntj.tax.org/. The authors use a simulation model to project the effects of various hypothetical scenarios, one of which is that, by 2050, the prevalence of obesity falls to that observed in 1978. Obesity is defined as a body mass index (weight in kilograms divided by height in meters squared) of 30 or higher. Because functional loss is correlated with obesity, in that scenario, the prevalence of functional limitations decreases. Those projections do not address institutionalization, so the institutionalization rates used in CBO's analysis are projected according to the same pattern used for people with three or more ADLs.

The third scenario is formulated under the assumption that the prevalence of functional limitations and institutionalization increases as average BMI rises. To calculate prevalence, given an increase in the rate of obesity, CBO created six age/sex population cells from which to estimate the prevalence of obesity and project it into the future. CBO calculated the weighted-average BMI for each of the six population cells for 2000 and 2010 and calculated the corresponding 10-year growth rates. Those growth rates were then used to project average BMI for 2020, 2030, 2040, and 2050. CBO classified respondents into two categories—obese and nonobese—and estimated the prevalence of functional limitations and institutionalization for both groups. As in Scenario 2, the association of obesity and functional limitations is held constant over the projection period. A weighted-average prevalence of functional limitations and institutionalization was then calculated for each decade using the projected obesity rates for each of the six population cells. CBO aggregated the cells to obtain the prevalence rates reported in the exhibits.

For Exhibit 21, the HRS reports the number of workers as well as the number of hours of assistance. The number of paid workers estimated using the HRS is consistent with the number of workers reported for 2010 by the Bureau of Labor Statistics (BLS). The BLS data were obtained online; see Bureau of Labor Statistics, "National Employment Matrix" (accessed May 7, 2013), http://data.bls.gov/oep/nioem. The following occupations are included in the counts of long-term care workers: licensed practical nurse; licensed vocational nurse; registered nurse; nurse aide; personal care aide; and home health aide who is self-employed, works in private households, or works in the industries of home health care services, services for the elderly and people with disabilities, other personal services, and personal care services. The BLS data report the number of long-term care workers in the nation as a whole; Exhibit 21, using the HRS data, reports the estimated number of workers providing services to elderly people, a smaller number. Demand for workers is projected to grow at the same rates as the prevalence of functional limitations described earlier in the three hypothetical scenarios.

Exhibit 22 reports the prevalence rates projected using the three possible scenarios.

For Exhibit 23, the projections start in 2010 with CBO's estimates of long-term care expenditures as a share of gross domestic product. The estimates of 2010 expenditures are based on published and unpublished data in the national health expenditure accounts provided by the Office of the Actuary at the Centers for Medicare & Medicaid Services. See Anne B. Martin and others, "Growth in U.S. Health

Spending Remained Slow in 2010; Health Share of Gross Domestic Product Was Unchanged From 2009," *Health Affairs*, vol. 31, no. 1 (January 2012), pp. 208–219, http://tinyurl.com/6nyuzrr. (The adjustments to identify the expenditures for elderly people were similar to those used for Exhibit 4.) The projections for 2020, 2030, 2040, and 2050 take the growth in resource needs implied by the three hypothetical scenarios and apply them to the 2010 estimate.